In order to explore systems that might support a market, it is important to understand the meaning of a ‘market’. Market is an arrangement that allows buyers and sellers who exchange things they might have for things that they might want. Traditionally markets have developed around places where there was good access to transportation and communication. It also made sense to organize a market in places that were nearer to the place where a product or a service was produced. For example, it made sense to trade in flowers in The Netherlands (c.f. Dutch Flower Auctions) because most of the flowers were commercially grown in that region. However, it made sense to trade cotton in England in the 18th century, because the British had the ability to sell cotton internationally, although most of the cotton was grown in the US. Today with the advent and commercial utilization of the Internet it makes sense to organize markets virtually. Hence we have seen the emergence of eBay and such like virtual market arrangements.

However in a market the different parties involved have only partial knowledge of the various variables associated with a product or a service. And in any economic system there is the classic problem of designing the most efficient manner in which knowledge can be communicated, such that people can make informed decisions. Therefore, there is a need to establish a means to communicate to ensure a cost effective way to communicate about a product or a service. Traditionally the Price System has been considered as a suitable mechanism for such communications. The Price System determines the prices of what is bought and the quantity bought, and what is supplied and the quantity produced. We can think of the Price System, and the economy of which it is a part of, as a machine with million parts. For the efficient functioning of the machine, there needs to be a way by which the various parts work in harmony. In the case of a centrally planned economy, firms need to be told what they should produce and how much. Similarly consumers need to be told what they need to consume. However in a market economy, the Price System coordinates the economic activity. High prices of a product or a service end up discouraging consumption of scarce resources and low prices encourage consumption of relatively abundant resources.

From the perspective of suppliers, a Price System helps in knowing what a buyer may want; besides items that might be in short supply or overproduced. Clearly price is a reliable piece of knowledge that derives the efficient running of a market. In terms of understanding the systematic role that information technology and the related systems might play in a market, it is important to consider the information-processing nature of the
market. The economics of information helps us in identifying areas where the Pricing System and the perfect market might fail because of informational imperfections. Any such imperfection presents an opportunity to evaluate the role of IT in supporting a given market.

Economists consider a Price System to be crucial in the functioning of a market. Indeed price can be considered the information system of a market. In an ideal situation a market would have perfect communication (i.e. access to the same information on prices and quantities of goods); instantaneous equilibrium and a zero transaction cost (for details see Hirschleifer [3]). In reality however this does not happen. Communication is not usually transparent since there are search costs associated with finding the best price. Haggling processes do not allow an instantaneous equilibrium. As a consequence, a number of integrative mechanisms come into being. These take the form of middlemen, brokers, dealers, auctioneers etc. Given the information processing imperfections in a market, there clearly are opportunities to improve functioning of markets. This is usually done by improving communication, supporting work of dealers and brokers, and in lowering cost of transactions.

**Opportunities for IT use in markets**

In identifying opportunities for IT use in a market, it seems logical to identify areas where asymmetries exist that cause the failure of a market in coordination and control. There are three possible areas where such asymmetries might exist. These are discussed below.

First, asymmetries could come about if there are faults in the information channels communicating the price. In such situations, consumers usually have to search for a price, which results in incurring search costs. In the airline industry, travel agents are the intermediaries that facilitate the process of searching for the right kind of a fare. Obviously time is spent by the specialized agents to search for routes and fares and because of high *search costs* a possibility existed for using IT. With the advent of the Internet and sophisticated programming, it is now becoming possible to minimize the search costs and smooth out the information channel asymmetries.

Second, asymmetries exist because of the quality of goods. Such asymmetries come into being because of the unique nature of an individual’s context and knowledge. Therefore, there is a possibility that such knowledge could be used opportunistically or strategically. Consider the example of pre-departure travel insurance. There are companies that sell insurance to individual travelers. Such policies generally have coverage for flight delays. The consumer does not have any knowledge of the likelihood of a delay. However, insurance companies do. This allows them to price particular products accordingly and even help them to sell the product. If the delay statistics is available to a particular traveler, as is the case with Expedia, and its possible to decouple various kinds of travel insurances, it is indeed possible to remove all asymmetries from the market. Clearly since some parties in the transaction have better information of the various aspects, it places them in a privileged position to exploit their knowledge accordingly. In reality, this may
however not happen because of the power and influence the brokers command in the insurance industry.

Third, asymmetries might come into being because of the monopolistic nature of certain markets. In a monopoly the seller generally fixes the prices of a product and hopes to sell it at that price or for something more than that. This is typically realized in an auction. Participants tend to reveal their options in an auction. In a monopoly the price of a product is then established at a level that is generally higher than the one that the seller originally establishes. It follows therefore that the use of the Price System in communicating about a product or a service is limited at times by the structure of the information. IT clearly offers opportunities to overcome the non-market hierarchical arrangements that might come into being.

Over the years a number of researchers have studied the manner in which IT can facilitate electronic markets. Malone et al [4] is his earlier work identified three possible ways in which IT can help in reducing information asymmetries. First, IT facilitates communication and hence it’s possible to transmit vast amounts of information in a relatively short period of time at a much lower cost. Second, the electronic brokerage effect allows potential buyers and sellers to be linked in a more intelligent manner. Third, the integration effect allows for a tight coupling of value added activities to the production and distribution aspects of the market. Malone et al also differentiated between markets and hierarchies and argued that by reducing the cost of coordination, IT can lead to a proportionately more use of ‘markets’ than ‘hierarchies’ as a means of coordinating economic activity. A market coordinates the flow of goods by balancing the supply and demand and other external transactions, typically between and individual and a firm. It is therefore a means whereby multiple buyers and sellers conduct business through an electronic intermediary. A hierarchy, on the other hand, coordinates the flow of goods by the process of controlling and directing. Therefore a hierarchy helps in integrating tasks and functions across a predetermined set of organizational boundaries. In any given situation, market and hierarchy coexist. Benjamin et al [1] used the market and hierarchy split as a basis to propose a two dimensional taxonomy of electronic commerce (see also Graham et al [2] (Table 1).

<table>
<thead>
<tr>
<th>Electronic Markets</th>
<th>Task support</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic Marketplaces (e.g. Airline Reservations; eBay)</td>
<td>Market oriented Non-Routine Support (e.g. Estate agent Colliers support system)</td>
</tr>
<tr>
<td>Electronic Hierarchies</td>
<td>Non-Routine Support (e.g. CIGNA Corporation’s task support system)</td>
</tr>
<tr>
<td>Electronic Data Interchange and supply chain integration (e.g. various applications of SAP)</td>
<td></td>
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</tbody>
</table>

**Table 1, Taxonomy of electronic commerce**

**The concept of service**

The notion of ‘service’ in a market is founded on the informational imperfections that might exist in a market. The idea of conceiving and implementing a range of services is a consequence of imperfections in the market. This allows for offering customized benefits
for goods and services that might be offered for sale. Biased markets evolve essentially because of competitive, legal and regulatory pressures. There are some exceptions to the ‘service’ concept. In situations where there are mass transactions of standardized commodities, service does not play a significant role. Then there are a large number of ‘universal services’, where un-customized services are provided outside of the real price system.

The question that arises is that how can electronic markets be designed? Clearly this demands positioning a venture along the evolutionary path suggested by Malone et al. Furthermore, it is also important to define how the electronic transactions are going to be carried out: relationship-based service; transaction-based service or universal service. Vepsäläinen and Mäkelin [5] provide a useful framework that helps in conceptualizing the design challenge.

Vepsäläinen and Mäkelin suggest that services have three generic components: service package; delivery channel; governance structure. When designing any service the objective is to find a best fit between the three components and at the same time taking advantage of available technology. Since our interest is in identifying appropriate use of IT, it is important to understand each of the dimensions in detail. Vepsäläinen and Mäkelin use the third dimension, governance structures, to explore the relationship between service package and delivery channel. The service package is defined on basis of the scope of service contract. The services could range from highly customized ones to mass transactions. The governance structures for the service package could range from highly focused ones (i.e. relationship based) for customized services to transaction based ones when costs vary according to volume of transactions. Based on this typology, three broad kinds of service packages can be identified: customized service; standardized service and mass transactions.

Delivery channels are defined on basis of the nature of channel systems. A channel system could vary from an agency support system (i.e. some narrow band decentralized channels relying on some back office) to a market network. The relevant governing structures for the channel system could range from a highly focused one (i.e. independent agents) to self-service through direct access by customers (i.e. a channel having high fixed costs and risks, but low fees). Accordingly, three broad categorizations of delivery channels can be identified: agency support system; corporate middleman system and market network. When we analyze the interactions between the kinds of service packages and delivery channels, a variety of service markets can be identified (see the diagonal in Figure 1). The service markets range from consultants and agents (i.e. centralized service support systems and agent's face to face contact) to electronic markets (i.e. when human intermediaries are bypassed). The middle of the diagonal represents services such as medical centers and banks. The inherent argument in the Vepsäläinen and Mäkelin framework is that any solution falling outside the diagonal is inefficient and hence the provision of IT will provide inadequate solutions. Such inefficiencies could result either in 'overwhelming the customers' (i.e. providing complex advice without adequate support) or in 'exploiting the customers' (i.e. a heavy organization that delivers simple transactions). It can be argued that when IT is used in providing services, it first impacts
the delivery channel and the general push is towards the right (Figure 1). With respect to service packages, the push is towards standardization so as to transform them into commodities of self-service.

![Service Package Diagram]

Figure 1. The service-strategy matrix (adapted from Vepsäläinen and Mäkelin)

References